

Color-XHDR - A Compact High-Speed Color Extreme High Dynamic Range Video Capability for Rocket Engine Testing, Phase II

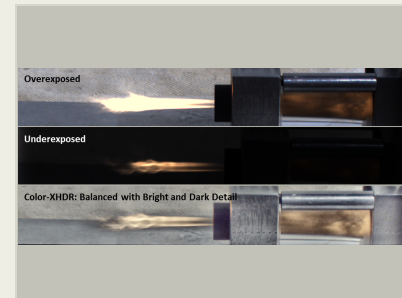
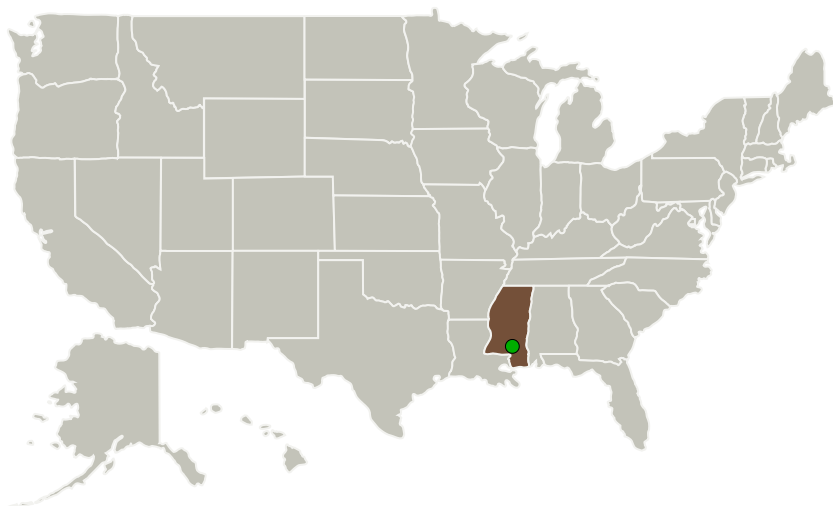
Completed Technology Project (2017 - 2019)



Project Introduction

Innovative Imaging and Research proposes to develop a 21st Century color, high-speed extreme high dynamic range (Color-XHDR) video recording technology that will produce engineering-grade video to accurately document rocket motor firings at close range within a test cell without image saturation. This novel imaging system will include a compact, single focal plane array camera and end-to-end image processing software to produce, high quality, low noise, high-speed video not currently possible with today's technology. The compact camera will be compatible with existing SSC camera housing and acquired imagery will be stored off-camera to prevent loss of information in the event of a mishap. The system will be able to record entire test sequences at >250 fps lasting up to 45 minutes. Most importantly, the system will produce XHDR (>120 dB dynamic range) HD format (1080p or larger) imagery so that relatively dark test cell infrastructure and test article hardware will be visible alongside exhaust plumes that may also contain ultrabright molten material. The imagery will be calibrated to provide engineering information such as radiance, color temperature and particle trajectories. Stereo calibration will enable multiple cameras to provide accurate 3-D XHDR image products. Rocket engine certification ground testing requires clear visual high-speed video recording that can capture essential information for NASA during rocket engine certification ground testing. This need is particularly true in the event of a mishap, when investigations into the underlying cause ensue. This technology can avoid common limitations of typical cameras such as image saturation, rolling shutter image wobble, camera geometric distortion, and no off-board storage, which makes it nearly impossible to obtain critical information in catastrophic situations that result in the loss of a camera.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Innovative Imaging and Research Corporation	Lead Organization	Industry Women-Owned Small Business (WOSB)	Stennis Space Center, Mississippi
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations

Mississippi

Project Transitions

**April 2017:** Project Start**April 2019:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140959>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innovative Imaging and Research Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

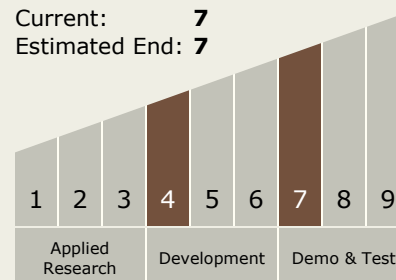
Robert E Ryan

Technology Maturity (TRL)

Start: 4

Current: 7

Estimated End: 7

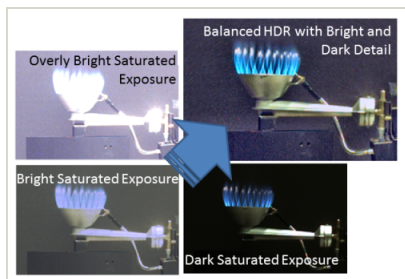


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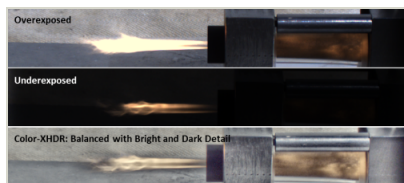


Images



Briefing Chart Image

Color-XHDR - A Compact High-Speed Color Extreme High Dynamic Range Video Capability for Rocket Engine Testing, Phase II Briefing Chart Image
(<https://techport.nasa.gov/image/127246>)



Final Summary Chart Image

Color-XHDR - A Compact High-Speed Color Extreme High Dynamic Range Video Capability for Rocket Engine Testing, Phase II
(<https://techport.nasa.gov/image/136586>)

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.4 Mission Success Technologies
 - └ TX13.4.5 Operations, Health and Maintenance for Ground and Surface Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System